

**The Learning MarketSpace, September 1, 2001**

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Written monthly by Bob Heterick and Carol Twigg, *The Learning MarketSpace* provides leading-edge assessment of and future-oriented thinking about issues and developments concerning the nexus of higher education and information technology.

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**THE OUTSOURCING PARADOX**

The juxtaposition of a couple of news items recently caught our attention. The Chief Information Officer of one of our premier institutions of higher learning argues that much of the technology infrastructure doesn't differentiate the institution and might better be outsourced. A vice president of one of our premier technology consulting firms counters that outsourcing isn't of much import because information technology is still a mission-critical activity in higher education.

So what have we got: new school versus old school, confusion about mission, or one of those frustrating little paradoxes that always seem to bedevil the higher education community?

Technology has been a visible component of higher education since the 1950s when several institutions actually designed and constructed early, notable computing devices. Over the next 30 years the contributions of higher education to both hardware and operating system software development were significant. But, from a research standpoint, with only a few exceptions, innovation had moved to the private sector by 1990 with the acceptance and ubiquity of the personal computer. Most computer science and computer engineering departments in higher education are noticeably unsuccessful in attracting outstanding undergraduates into graduate school and eventual careers in higher education. The lure of start-up riches, well-financed laboratories, and the intellectual challenges of like-minded colleagues draws the best and brightest into the commercial sector.

The halcyon days of mainframe computing witnessed extraordinary innovation in software systems in higher education. Many of our back-office system vendors can trace their beginnings to a spin-off from some university software development enterprise. Similarly, the early days of networking—ARPAnet and BITNET in particular—were replete with significant contributions from the academic community. Higher education spearheaded the transition from proprietary protocols to TCP/IP and the Internet. The domain of wireless networking is still benefiting from major contributions pioneered in the academic world. But, as this field matures, we can expect to see most of the innovation translate to the commercial sector.

For thirty years, higher education was the beneficiary of some of the best and brightest minds in the field of information technology. One has only to listen to the laments of higher education CIOs about the difficulty of recruiting and retaining highly qualified staff to recognize how dramatically the situation has changed. Many of our larger, premier institutions of higher learning are now experiencing what their smaller, less well-funded brethren have known for many years.

Abandoning the "not-invented-here" syndrome comes hard for many in higher education. But, we no longer design and build our own computers, we no longer write our own operating systems, we no longer code our administrative or library systems applications, and, by and large, our networking software is commercially acquired. It doesn't seem such a stretch to think about outsourcing disaster recovery, server farms, back-up, or any of the host of activities that are provided in the deep technology infrastructure of a campus.

One could argue that these are not mission-critical applications for higher education. As we move closer to the visible surface of the institution, the argument over whether or not some particular application is mission critical becomes a good deal more fuzzy. Some of this fuzziness no doubt stems from some very real conflict over what, exactly, is the mission of a particular institution of higher education.

The incorporation of technology into the learning process has caused many to question whether the institutional mission is concerned more with teaching or with learning. Is the institution embodied in classrooms, residence halls, athletic facilities, the library building, an on-site teaching faculty? Or is the institution a less physical artifice that organizes and facilitates learning, bestows credits and degrees, and provides learning mediation? In truth, many institutions are somewhere between these extremes, either in transition from bricks to clicks or in the process of determining what is the right marriage of bricks and clicks. Where an institution perceives itself in this spectrum, and where it thinks it is eventually headed, will have a lot to do with what it considers mission-critical in its technology infrastructure.

Is it reasonable to think that an institution should, or could, outsource its back office systems, its library system

or its campus portal? In those institutions where the critical mass of scale doesn't exist, outsourcing some or all of these functions may be a necessity. Higher education is replete with examples of consortial activity to overcome perceived deficits in scale. It would be hard to imagine a single institution trying to replicate the work of OCLC or JSTOR. The decision on what is, or is not, mission critical technology support is likely to be viewed very differently by the large, well funded, research university and the very small, residential liberal arts college. Absent the bottom line metric of commercial enterprises, there is little incentive, other than inability to staff, to encourage an institution to outsource.

The real paradox of outsourcing is the rapidity with which academic institutions and their faculties have embraced the products of commercial enterprises such as WebCT, Blackboard and others. The very forefront of the institution, teaching and learning support, has gravitated to outsourcers. By and large, these products are not content but rather a shell or container for content that is still supplied by the institution and its faculty. At root, these products don't require any change to the view that the institution is primarily focused on teaching in the historic sense of the word.

The real test of outsourcing acceptance will come when undeniably high quality learning materials, appropriate for college and university courses, begin to proliferate in the marketplace. The acceptance of outsourcing in this domain will require a significant redefinition of the primary role of faculty and the business model of the institution.

Just as the major telecommunications companies have had to realize that they were not in the voice communication business (or at least that voice represented a significantly declining share of wireline communications traffic), institutions of higher learning will have to recognize that are not in the teaching business (or at least that teaching in campus lecture halls will represent a declining share of the learning marketplace).

—RCH

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#### **BULLETIN: SOMEONE'S STOPPED FILMING STAGE PLAYS**

In our most recent issue, we observed that mass customization is emerging as the organizing business principle of the 21st century and cited Ohio State's redesign of its introductory statistics course as one of the first examples of this phenomenon in a collegiate online course. We also expressed the idea that offering students a "buffet of learning opportunities" metaphorically captures where the online learning environment is headed (or should be headed!) Like the first motion picture that moved beyond capturing a stage play on film, the buffet approach takes advantage of the capabilities of the technology and, in so doing, produces something radically new and important.

Just as the Internet now makes it possible for customers to order products and services designed to their exact needs and specifications, so too does it allow us in higher education to create educational offerings that can be mixed and matched to suit the needs of the individual student. Doing so can be beneficial to institutions as well because teaching supply can be more closely aligned to learning demand.

Here's an example of what we mean.

Colleges and universities nationwide face a serious supply and demand problem in the field of information technology. Students want both courses and majors, but institutions have trouble finding sufficient faculty to meet the demand. Under the auspices of the Pew Grant Program in Course Redesign, Drexel University is dealing with this problem by redesigning and combining two introductory Computer Programming courses, which together are required for 33% of all freshmen. The two courses are Computer Programming I, the primary entry point for computer science majors, and Computer Programming B, a less technical version of the same course.

Since the computing backgrounds of entering students vary widely, the traditional lecture-based format that treats all students as if they are the same has substantial limitations. To accommodate student diversity, a mixture of presentations and hands-on participatory learning experiences using interactive, Web-based modules will replace the traditional model. In addition, course credit will be variable: it will depend on the number of modules successfully mastered and the level of skill mastery the student attains.

To accommodate different student learning goals, the modules themselves will cover particular aspects of computer programming at different levels of knowledge and skill acquisition. Students will be assigned work and reading from the module at a level appropriate to the objectives of the long-term goals of their major, allowing those in different majors to acquire the appropriate skill level for each technique and concept. Thus, information systems majors will need to master one subset of the material; computer engineering majors will need to master additional material beyond that needed for information systems; and computer science majors will need to master the entire module. Students will be able to access all levels of each module, allowing those in less technical majors to learn additional material if they desire.

The redesigned course modules will be organized according to Bloom's Taxonomy, which delineates levels of subject mastery as follows:

- *First level.* Students know the terminology and specific facts about a subject.
- *Second level.* Students gain increased comprehension of the material and can explain and interpret what they have learned.

- *Third level.* Students can apply their knowledge in new situations to solve relatively simple problems.
- *Fourth level.* Students can analyze problems to discover component parts and interactions.
- *Fifth level.* Students can apply prior knowledge in original ways to produce things that are new and different, and evaluate the methods used.

Each student must complete the level designated for his or her major, including passing the final assessment quiz. Level three is the minimum level of mastery for all students to attain. Both computer science and computer engineering students need to reach the fifth level of mastery to some degree since they will face highly technical problems that will need to be solved in original ways.

The modules will also be designed so that three modules encompass material equivalent to one credit. If a student successfully completes nine modules, it will be the equivalent of completing a traditional three-credit course. Students will receive course credit based on the number of modules they complete and the level within each module that they master. Students who have difficulty with the higher levels will be able to change majors and still receive course credit without having to drop the course and repeat modules already mastered. This aspect of the course design addresses a significant resource problem at Drexel since many students enroll in computer science without understanding the nature of the work. Once in the course, they may find other computing majors more appealing. The redesigned course will enable them to change majors without losing the work they have invested in a programming course for their now-abandoned major.

Students will also be able to enter the course in one of three cohorts based on their performance on a knowledge and skills placement test. The modular approach will allow Drexel to place advanced students more accurately so that they will not need to cover material they already know. Those with little or no programming experience will enter at module one and earn three credits for successfully completing all nine modules. Those with some skills and knowledge will enter at module four and earn two credits for successfully completing the remaining six modules. Those with moderate skills and knowledge will enter at module seven and earn one credit for successfully completing the remaining three modules. Students will also be able to review earlier modules if they wish to make sure their knowledge is complete, and they will be able to do so at their own pace without being held back by students for whom this knowledge is new.

Like Ohio State, Drexel's goal is to create modules that provide a buffet of learning opportunities for the student including online access to digitally recorded lecture presentations; reading materials developed by the instructors or in the assigned textbook; examples and exercises in the student's field of interest; links to other online materials of interest; individual and group laboratory assignments; self-assessment material to provide feedback on the skills being learned. The new organization of the course and the materials and activities will allow for greater flexibility in catering to diverse learning styles: students can rely on the textbook, lectures, group work, or individual coaching to master a module. In addition, students will be able to seek help from a variety of different people: the faculty member, graduate TAs, and peer mentors, again allowing flexibility in interacting with the person who can provide the best help for each particular student problem.

And like Ohio State, two factors in Drexel's strategy are key: the collective commitment of the mathematics and computer science faculty to work on the course as a whole and the capabilities provided by information technology.

For those of you who have always wondered why every topic of academic study, be it Shakespeare or nuclear physics, fits neatly into a three-credit package, think about how you can apply Drexel's strategy to your own area of study. Ohio State is modularizing one course; Drexel is modularizing and combining two. These pioneering faculty and institutions have abandoned the stage play and created the beginnings of a new educational form that takes advantage of the medium in which it is offered.

A buffet of learning opportunities—coming soon to a campus near you!

For more information about Drexel's redesign project, please see [http://www.thencat.org/PCR/R3/DU/DU\\_Overview.htm](http://www.thencat.org/PCR/R3/DU/DU_Overview.htm).

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**UPCOMING LEADERSHIP FORUM EVENTS**

**STATE-OF-THE-ART LEARNING ENVIRONMENTS: LESSONS FROM THE PEW GRANT PROGRAM IN COURSE REDESIGN**

December 3, 2001, Orlando, Florida  
 February 25, 2002, Dallas, Texas

Co-sponsored by the Executive Forum in Information Technology at Virginia Tech

This seminar will present results from the second of three rounds of the Pew Grant Program in Course Redesign. Learn from faculty project leaders how to increase quality and reduce costs using information technology. Faculty from four institutions will talk about their models of course redesign, including their decisions regarding student learning objectives, course content, learning resources, course staffing and task analysis, and student and project evaluation. These models provide varied approaches that demonstrate multiple routes to success, tailored

to the needs and context of each institution.

These seminars provide a unique opportunity for you to:

- Learn firsthand how to increase quality and reduce costs using information technology from successful faculty project leaders.
- Find out how to design learning environments for the future by tapping the expertise of those who have done it.
- Talk with experienced faculty from multiple institutions about how and why they made their redesign decisions.
- Move beyond "today" and learn where on-line learning is going . . . find a model that will work for your institution.

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